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ABSTRACT

This document offers the comments of an attendee at the Phase IV conference of the Michigan Consortium on Assistive Device Delivery Systems (MCADDS). It is noted that the fourth year conference's general emphasis was on the need to inform and educate others about assistive technology and to increase general acceptance of disabilities. In addition to the comments, an update to the Michigan Consortium on Assistive Device Delivery Systems Directory which lists services providing information on assistive devices is presented. The 1991 update describes current and projected activities of 11 service providers. Availability information concerning videotapes of the MCADDS conference proceedings is also provided. (JDD)

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PERSPECTIVES AND DIRECTORY
Assistive Devices Consortium

No. 69

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Arselia Ensign, Editor

Introduction

A limited number of copies of a resource directory of the major Michigan services providing information on assistive devices is still available . It may be secured by sending $4.00 to the PAM Assistance Centre. This includes postage and handling. This second edition, reflecting the input of participants in the Michigan Consortium on Assistive Device Delivery Systems, was published in January of 1990.

Prior to the fourth year conference of persons representing these services, an invitation was issued to update Directory information. Those organizations which elected to provide such information are represented in this publication.

The Phase IV conference itself elicited some provocative information. Once again Hunt Riegel was invited to reflect upon information shared and provided us by our excellent resource persons:

Michael L. Morris (Assoc. Executive Director, Community Services Division, UCPA, Washington, D.C.)
Dr. "Rich" Baldwin (Director, Special Education Services, Michigan Department of Education)
Mike Gambotto (Michigan Commission on Handicapper Concerns)
Senator Debbie Stabenow (State of Michigan)
Dr. Gene Kyle (Special Education Consultant, Michigan Department of Education)
Lynn Sweeney (Director, A.C.T. Center, C.M.U.)
Dr. Ralph Pritchard (Macomb I.S.D.)
Lyle L. Stephens (Special Transportation, Inc.)
Bob Beard (Michigan Rehabilitation Services)

A portion of Dr. Riegel's summary follows. The reader will note that there are some challenging implications in his statements.

Perspectives

A review of the Assistive Devices Consortium reveals the following general emphases addressed in the past four years.

I **1988**-Expressed need to form a consortium for continuing dialogue.

II **1989**-Expressed need to improve networking activities.

III **1990**-Expressed need to improve inclusion efforts.

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IV **1991** – Expressed need to inform and educate others about assistive technology in the areas of technology in general and the ADA in particular, and to increase general acceptance of disabilities.

When asked to give some perspective on the proceedings of Phase IV of the Assistive Devices Consortium I thought my task would be simple: Give some historical information and respond to the presenters. But as the sessions progressed I became intrigued with a pattern which emerged. Hundreds of thousands of person-hours have been expended in Michigan alone to explore, develop and promote assistive technology, and here we are again facing a barrier. This time it appears to be an information barrier.

It occurred to me that the best perspective that could be offered from this session was a collage of some of the key phrases of the participants at this meeting, coupled with the individual reflections this particular collage might engender. Though the word 'perspective' implies breadth of vision, all vision has a reference point. For all of us, the reference point rests with the individual.

Some examples (with editorial comments in parentheses):

- Most of the handicapper respondents to our survey about technology didn't know technology existed.
- One of the three best ways to get information is in a printed newsletter. (Literally thousands of copies of newsletters are distributed in Michigan. They are apparently stopping short of the most affected audiences.)
- A tremendous amount of technology is sitting in closets giving dust a resting place.
- The Tech. Act proposal has been sent in for the third year now, in hopes that this year it will be successful. (Does anyone outside of the office in which it was written know what it contains?)
- The new state director of special education presented us with a total of 32 concepts, including strands, themes, future themes and the like. (There was general approval and support for Dr. Baldwin's efforts and intent. However, research still suggests that our limits on information processing approximate five plus or minus two items at a time.)
- Students with disabilities need ***all*** teachers and professionals to have high expectations. (Articulated by a handicapper who also noted that high expectations are still difficult to find in our educational system.)
- We have a long way to go in this country to get people to understand communication barriers as well as they understand physical barriers.
- All civil rights legislation is oriented to shifting the burden (and the responsibility) from the public to the private sector.
- We are ***still*** very short of trained people.
- Almost never is ***anyone*** qualified to work alone (in the field of assistive technology).
- Those who most consistently fought the Handicappers' Civil Rights Act are now the governor's closest advisors.

- The people who have difficulty with change are struggling right now. They will either have to come to grips with it, or retire.
- Those involved in developing the core curriculum for the state should consider alternative access modes.
- The current draft of the core curriculum for technology is a joke.
- Remember, although the individualized written rehabilitation plan (IWRP) must include addressing assistive technology needs, this will only be implemented by the individuals on that team (who may or may not be trained).
- (On exploring creative uses of existing equipment) As we venture more and more into areas involving uses other than the manufacturer's original intent, the threat of liability becomes inescapable.

R. Hunt Riegel, Ph. D.

1991 Updates: The M.C.A.D.D.S. Directory

Name of service: ***Adaptive Devices Applied Methods Lab (ADAM LAB)***

Name of agency (sponsoring, employing): ***Wayne County Intermediate School District***

Address: ***33500 Van Born Road, Wayne, Michigan 48184***

Telephone number: ***(313) 467-1610 or (313) 467-1415***

Contact Person : ***Greg Turner*** **Position**: ***Director***
Jan Jarrell, Marge Nielson, John Smallwood

1991 - Projected or Underway

1. Revision also of Wolf, hardware/software
2. R & D digital voice synthesizer to replace Wolf synthesizer chip

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Name of service: *4-Sights Network*

Name of agency (sponsoring, employing): *Greater Detroit Society for the Blind*

Address: *16625 Grand River Avenue, Detroit, Michigan 48227*

Telephone number: *(313) 272-3900*

Contact Person : *Mary Beth Kullen* **Position:** *Information Systems Supervisor*

1990 - Activities of note

A summer program has taken place the past three or four years which involves blind high school studentsin a summer work experience. The program includes information, training and assignments which use computers. The outcome is a small group of students (4-6 each summer) who have work experience and a familiarity with computers. Students work 20 hours a week, and some are given supervisory responsibilities to enable the program to function without the employment of additional staff. Those students also leave the program with enhanced leadership skills.

Efforts are also underway to update the Occupational Information Library for the Blind. The OILB seeks to describe how blind people are employed in the work place today, whether they use technology, how they prepared for the job, and how they do their job. The OILB is located on the 4-Sights Network which is a national computer communications system for blind and visually impaired persons and those who provide services to the blind. There is no charge to use the system.

An outline was developed to describe the types of technology most useful to blind and visually impaired persons. It posed questions to be considered before the purchase of a piece of technology, and described some of the products currently on the market. This has been disseminated to student teachers in V.I. programs, clients, and other professionals.

1991 - Projected or Underway

Research into the employment of blind persons continues through the OILB update project.

The 4-Sights Network is scheduled to be housed in a new computer to increase speed and ease of access.

The 4-Sights staff is seeking to make contacts with schools which have career programs for their V.I. students in order to explore using the Network as a point of contact between the blind student and an employed blind adult. A number of blind adults use 4-Sights and have indicated a willingness to exchange electronic mail with students.

References

The "Center for Quality Special Education" Special Education Program Outcomes Guide: Visual Impairment has nicely summarized goals for blind or visually impaired students to achieve in academic and daily living skills areas.

Name of service: *Alternative Communication Technology Center of Central Michigan (ACT Center)*

Name of agency (sponsoring, employing): *Central Michigan University (in association with Allied Health Services)*

Address: *441 Moore Hall, Central Michigan University, Mt. Pleasant, Michigan 48859*

Telephone number: *(517) 774-7384*

Contact Person : *Lynn A. Sweeney* **Position:** *Director*

1990 - Activities of note (briefly describe those which might be replicated or shared)

A new course entitiled " Augmentative Communication and Enabling Technology" has been added to our program. In addition, a variety of workshops are offered off campus. Workshops of current interest include: Learned Dependency Among the Severely and Communicatively Impaired, Manual Communication as an Augmentative System, and Whole Language for Special Needs Children.

Act has provided a number of Assistive Technology workshops in the past. These have traditionally been free to the public. This April we will participate in a two day workshop which celebrates the 50th anniversary of our Communication Disorders Department. The workshop will include prestigeous speakers on a variety of communication topics and will be offered for a minimal fee.

Results of the three year study on analysis of manual communication were presented at the 1990 ISAAC conference in Stockholm Sweden. The director also attended the ISO meeting on wheelchair restraints in Metz France.

We now have a behavioral consultant who works with us to help AAC candidates and their family members who have special needs in this area.

Several new materials and pieces of equipment have been acquired for use in testing, assessment and intervention. Our clinicians in preparation are in more sites than ever including full-time in the classroom intervention and consultation, hospital, and infant intervention. Any school, hospital, or clinical facility interested in a graduate clinician assitant should contact the ACT Center.

1991 - Projected or Underway (list of instructional materials, research, forms developed, etc.)

Research continues in the areas of learned dependency among AAC candidates and manual communication applications. Evaluative protocols are being finalized for both of these areas based on our findings and will be published within the next year. New product development/research projects are now underway. Graduate student research stipends are availabe for work on these projects. We are coordinating with the faculty of the computer science department on a Bliss project.

The ACT Center is in the process of developing a video tape library for orientation and programming instructions for use of dedicated communication aids. These tapes will be available for individual or facility loan upon completion.

References - (note print materials or other media you have found to be helpful)

References for the above are numerous. For more information on references or services please contact, Lynn Sweeney at the phone number provided above.

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Name of service: ***Charles Van Riper Language, Speech, and Hearing Clinic***

Name of agency (sponsoring, employing): ***Western Michigan University***

Address: ***Department of Speech Pathology and Audiology, Western Michigan University, Kalamazoo, MI 49008***

Telephone number: ***(616) 387-8047***

Contact Person : ***Harold L. Bate, CCC-A*** **Position:** ***Professor, (616) 387-8052***
Assistive Listening & Alerting Devices
Nickola Nelson, CCC-S ***Assoc. Professor, (616) 387-8058***
Augmentative & Alternative Communication

1990 - Activities of note

--Provided consultation regarding augmentative communication strategies and technology to a variety of clients of all ages and many disability types (Hillenbrand, Glista, Nelson).

--Provided consultation and demonstration of assistive listening devices to community groups and university classes (Bate).

--Offered a graduate course in Augmentative and Alternative Communication, both on this campus and in Lansing over a number of weekend sessions (Hillenbrand & Glista).

--Provided clinical services for clients needing aural rehabilitation in a group setting focused on helping them integrate technology and strategies in their lives (Bate).

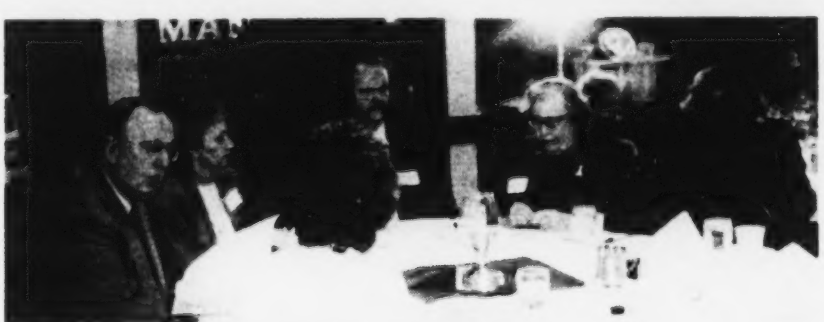
--Presented a paper called "Performance is the Prize" as part of a miniseminar panel discussion, entitled "Whatever happened to language considerations with children using augmentative communication" presented with Janice Light, Melanie Fried-Oken, Sima Gerber, and Arlene Kraat at the annual conference of the American Speech-Language-Hearing Association, Seattle, WA, November 16, 1990 (Nelson).

1991 - Projected or Underway

--Ongoing participation in the development and field testing of the Vocabulary Tool Box (Nelson). Beukelman, D. R., & Tice, R. (programmer). (1990). *The Vocabulary Toolbox* [computer program]. Field test version under development at the University of Nebraska-Lincoln, Lincoln, NE. [A Building Bridges Project of The American Speech-Language-Hearing Foundation]

--Upcoming presentation at the Pre-CEC conference (Nelson & Hillenbrand), entitled "Including children with AAC needs in regular classrooms," March 6, 1991, Grand Rapids.

--Upcoming presentation at the MSHA conference (Glista, Hillenbrand, & Nelson), entitled "Beyond Expertise: Using a collaborative model for decision making in augmentative communication," March 16, 1991, Traverse City.



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Name of service: ***Equipment and Technology***

Name of agency: ***The Detroit Institute for Children***

Address: ***5447 Woodward Avenue, Detroit, MI 48202***

Telephone number: **(313) 832-1100**

Contact Person: ***Lezlie Adler*** **Position:** ***Vice President, Rehabilitation Care***

1990-Activities of note

1. Development and sales of the second generation AudioScan. The AudioScan has been totally redesigned to provide a male and female human quality voice, significant increases in memory, longer lasting memory, more opportunities for control of toys, easier programming, and space age appearance.

2. Development and distribution of a convertible child's chair and table to be used for young children in the bath tub, floor, outside, etc. Light weight and portable and grows with the child. Manufactured and distributed by Danmar Products.

3. Development of a single switch operated table top robot to be used as a finger feeder, fetcher, and toy. Multiple terminal devices to hold food, utensils, magnet, scoop, etc.

4. Development of a single switch operated television control. Independent control of on/off, volume up/volume down, channel up/channel down.

5. Development of a child's ski exercise machine. Home based exercise/therapy for children with mobility problems.

6. Reorganization of the Equipment and Technology Program to provide assessments, prescription, and training in the areas of mobility, computers, activities of daily living, seating, toys, augmentative communication, and seating.

1991-Projected or Underway

1. Designation as the HASBRO TOY COMPANY COMPUPLAY CENTER.
Development and implementation of computer evaluations, training drop in center, and lending library for children and their families to enjoy using computers as a leisure time activity and for school.

2. Clinical site for the research in the use of mobile robots to train children in spatial relationships, switch control and as a precusor to electric mobility.

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Name of service: ***Michigan Consortium for Enabling Technology (MCET)***

Name of agency (sponsoring, employing): ***Michigan Consortium for Enabling Technology***

Address: ***B419 West Fee Hall, Michigan State University, East Lansing, Michigan 48824-1316***

Telephone number: ***(517) 353-1940 Voice/TDD***

Contact Person : ***William H. Hinds, Ed.D.*** **Position:** ***Executive Director of MCET***

1990 - Activities of note

Recent achievements include completion of the first statewide video teleconference on enabling technology called "Environments 2000". This October 2, 1990 teleconference was part of the State of Michigan's **Investing in Ability Week** with MCET coordinating "Technology Day". Thirty-two downlink sites broadcast this live teleconference on assistive device technology; videotapes are available regarding this teleconference.

Another "first of a kind" linkage has been achieved with the establishment of a Telecommunications Network for Enabling Technology (TNET) under the auspices of MCET. The primary mission of this computer network is the sharing of information that relates to development, selection and acquisition of assistive device technology products by handicappers.

MCET facilitated various research and development projects this past year including:

1) A Computer Based Route Assistance System (CBRAS) through the work of several researchers at Michigan State University.

2) A prototype development for a Head and Neck Support project (HANS) was initiated by a researcher under the auspices of Michigan State University with application for persons with disabilities who need neck support.

3) MCET also sponsored research in the use of a robotic arm rehabilitation therapy system which was developed at Wayne State University. This system focuses on developmental exercise tasks for rehabilitation of individuals with a need for increased functional use of hands and arms.

4) This past year MCET also supported work on an autonomous mobile platform for rehabilitation at the University of Michigan. Work on this mobile autonomous task guidance system will contribute to the development of assistive device systems for people with cognitive deficits. This research is on-going at the University of Michigan, Department of Physical Medicine and Rehabilitation.

1991 - Projected or Underway.

A research activity called the "Environments 2000" project has been initiated by MCET, along with collaborative efforts of several manufacturers, Michigan State University, Wayne State University, the University of Michigan, and Equal Access Technology. The goal of this project is to design an integrated module work environment which can be custom configured to the needs of persons with disabilities.

Name of service: *Michigan Consortium for Enabling Technology (MCET)*

References.

Journal of Rehabilitation Research and Development; Department of Veteran Affairs; Journal of Rehabilitation from the National Rehabilitation Association; and, **Headliners**, the brain injury magazine.

Name of service: *Macomb Augmentative Communication Project*

Name of agency (sponsoring, employing): *Macomb Intermediate School District*

Address: *44001 Garfield Road, Mt. Clemens, Michigan 48044*

Telephone number: *(313)* 228-3300

Contact Person : *Dr. Kathleen Pistono, Chairperson* Position: *Speech/Language Consultant*

1990 - Activities of note

The Augmentative Communication Project has been concentrating on activities at the classroom level. Members of the team have assisted the teachers in meeting the needs of their students. The team also produced a video tape for "Invest in Abilities Week" sponsored by the State of Michigan. The tape was presented as part of a two-hour teleconference in the early fall. Our selection of the presentation was entitled, K-12 Education. The 15 minute tape, "Invest in Abilities," showed augmentative device users and some of the programs in our county. The tape is available from Dr. Ralph Pritchard, Instructional Technology Department, (313) 228-3415.

1991 - Projected or Underway

The Special Education Learning Materials Services has established a communication board builder service for the teachers. Utilizing the Mayer Johnson communication symbols and other graphics, teachers will be able to produce communication boards on demand by using a Macintosh computer and Laser printer.

The project team will be producing a newsletter, Speechless Communicator, in the spring that highlights activities of the school year. We will also be conducting a "team building" workshop in April. This workshop will work with selected teams from district to assist them in developing a district level augmentative communication team.

References - (note print materials or other media you have found to be helpful)

1. Can't Wait to Communicate! Fun activities that shape Nonverbal Communication
   Author Robbie Wise
   Imaginart Press
   Idyllwild, California

2. The INteraction CHecklist, (INTECH)
   for Augmentative Communication
   Imaginart Communication

BOTH AVAILABLE FROM:
Don Johnson Developmental Equipment
P.O. Box 639
Wauconda, IL 60384
(708) 526-2682

Name of Service: ***Oyer Speech-Language-Hearing Clinic***

Name of Agency: ***Michigan State University***
Department of Audiology and Speech Science

Address: ***101 Wilson Road, East Lansing, Michigan 48824***

Phone: **517-353-8780**

Contact Person: ***Assistant Clinical Director***

1990 - Activities of Note

Assessment and intervention services for communication disorders (speech, language and hearing) to include disorders of articulation, language delay, aphasia, stuttering, non-speech, voice disorders and various forms and degrees of hearing impairment. Services for pediatric, impedance and auditory brainstem as well as hearing aid evaluation, selection and fitting and other assistive listening devices.

1991 - Projected or Underway

See above.

AUDIOLOGICAL SERVICES

Hearing Evaluation: This service consists of pure-tone, speech, and impedance audiometric testing to determine the degree and nature of the client's hearing impairment. The results of these tests are evaluated and discussed with the client and family, with appropriate recommendations and/or referrals being made.

Pediatric Audiologic Evaluation: For infants and young children testing is accomplished through the use of a series of special procedures designed to determine the presence or absence of a hearing impairment. When possible, the extent and nature of the hearing loss is established. If necessary the child will be referred for further evaluation.

Impedance Audiometry: Impedance audiometry is offered to aid physicians in determining the functioning of the middle ear, and in determining the nature of any middle-ear pathology.

Auditory Brainstem Evoked Response Audiometry: This provides state-of-the-art testing for neurological disorders, and hearing impairment for difficult to test patients and infants.

Hearing Aid Evaluation, Selection, and Fitting: This service consists of detailed testing with various makes and types of hearing aids to assist in the selection of an appropriate one. Computerized fitting formulas are used to precisely fit the hearing aid. The client will be assisted in purchasing a hearing aid, including custom-fit in-the-ear hearing aids. All follow-up, warranty, and repair services are completed through the Clinic.

Aural/Oral (Re)Habilitation: This service includes such programs as hearing aid orientation; speech reading; auditory training; and communication intervention activities for infants, preschoolers, school-aged children, and adults.

Spectral Analysis of Hearing Aids: If an individual feels that the hearing aid is not performing adequately, it may be brought to the Clinic for a specialized analysis. Appropriate recommendations will be made for repair or replacement.

Assistive Listening Devices: The Clinic has a number of devices for use in everyday situations to assist those with a hearing impairment. Items include closed captioned television, telecommunication devices for the hearing-impaired, visual devices, and personal amplification systems.

For further information call or write:

Department of Audiology
and Speech Sciences
Oyer Speech-Language-Hearing Clinic
Michigan State University
101 Wilson Road
East Lansing, MI 48824
Phone (517) 353-8780

CLINICAL SERVICES

Professional services are provided in a variety of areas including: wheelchair mobility; seating and postural support; environmental control; augmentative communication; computer access; computer literacy; manipulation aids; education; recreation; and vocational rehabilitation. Evaluation, prescription, and training for assistive technology are performed together with Rehabilitation professionals from within the University of Michigan Physical Medicine and Rehabilitation Department as well as those from outside agencies and institutions. The level of services provided range from the prescription of an appropriate "off the shelf" system, to modification of commercial systems, to the design and development of custom systems (if appropriate and well justified).

The Rehabilitation Engineers within the UMREP have a thorough knowledge of commercially available systems and components in addition to engineering skills required for custom modification, design, and fabrication. An important part of their background includes disability and rehabilitation studies, physiology, anatomy, neurophysiology, psychology, medicine and other sciences needed to understand disability, evaluate client needs, and prescribe technology. From an engineering perspective, the UMREP Rehabilitation Engineers have training in electronics, mechanics and biomechanics, computer science, ergonomics, human factors engineering, and other engineering areas. The UMREP staff work closely with physicians, occupational therapists, physical therapists, speech pathologists, psychologists, orthotists and prosthetists, nurses, and other health professionals involved in rehabilitation.

The UMREP has an additional off-site location entitled ***UM Rehabilitation Technology Services*** (UMRTS). Services provided at this location are in the areas of wheelchair mobility and specialized seating which include evaluation, prescription, fitting, fabrication, and follow-up for seating and mobility systems. The evaluation team includes therapists, rehabilitation engineers, and technical seating specialists.

The patient population served by the UMREP covers a wide range of disabilities including spinal cord injury, head injury, cerebral palsy, myelodysplasia, neuromuscular disease, and multiple sclerosis, among others. Services are provided to patients and clients from a broad array of programs and referral sources: The Department of Physical Medicine and Rehabilitation (PM&R) at the University of Michigan Medical Center offers services ranging from acute rehabilitation to community re-entry, independent living, and vocational programs. The PM&R Department has three separate inpatient Services: Spinal Cord Injury, Adult Rehabilitation, and Pediatric Rehabilitation, as well as an adult Rehabilitation Unit within a community hospital. Other inpatients are referred from Medical Center Services including Neuro-Intensive Care, Medicine Intensive Care, Neurology, Surgery, Pediatrics, Arthritis, etc.. Outpatients are referred from clinics throughout the UM Medical Center. The PM&R Department also has a number of community based programs including, amongst others, a comprehensive outpatient treatment facility, pediatric and adult head injury day treatment programs, and a Center for Occupational Health and Rehabilitation. The UMREP provides services to outpatients from these Programs as well as clients from outside referral sources and agencies including other hospitals, health professionals, vocational rehabilitation agencies, school systems, and personal referrals.

CLINICAL TRAINING PROGRAM

The clinical training program in rehabilitation engineering includes both a clinical internship within the University of Michigan Rehabilitation Engineering Program (UMREP), leading to a Certificate of Completion for the UMREP Internship; and a course of study through the UM Graduate Program in Bioengineering, leading to an M.S. in Bioengineering. Individuals with an existing graduate degree in Bioengineering or its equivalent can also be considered for the internship alone.

Entrance requirements for the Bioengineering Graduate Program include a minimum number of courses from the fields of biology, physiology, anatomy, or other appropriate areas for a student with a bachelor of science in engineering or physics. For students with an existing bachelor's degree in the life sciences, demonstration of an adequate background in math, physics, and fundamental engineering (circuits, mechanics, fluid dynamics, etc.) is necessary. Bioengineering core course requirements include advanced physiology, bio-instrumentation, and statistics. Approximately one-third of the 30 credit hour master's degree requirement are available for electives. Electives can be in a variety of appropriate areas offered through other departments, including medicine, computer science, rehabilitation, human factors/ergonomics, psychology, math, engineering, or other sciences. Specific electives offered through the Bioengineering Program cover a wide range of topics, such as bio-materials, instrumentation, biomechanics, ergonomics, human factors engineering, and neurophysiology, which can have direct application to the field of rehabilitation and assistive technology. Rehabilitation engineering interns are closely counseled and advised regarding which courses would best support their clinical service training and career pursuits.

One aspect of clinical service training includes participation in all aspects of the UMREP service delivery program, ranging from technical lab work, to system set-up, to client evaluation and training. Written documentation of client history, visits, evaluation, and equipment and training recommendations are an important part of this aspect of the clinical internship. A second aspect of clinical and service training is an academic study track. This track begins with an introductory directed study course (usually taken as an elective within the Bioengineering Program) which covers disability, rehabilitation methods, etiology of disability, psycho-social aspects of rehabilitation, and functional outcome expectation (including daily living activities, education and vocation). The directed study, consisting of reading and discussion, is followed by a formal course on disability and rehabilitation offered each year by the Department of PM&R. This course includes a wide array of topics and approaches disability issues from a variety of viewpoints. It includes a review of disabilities by diagnostic categories, the roles of rehabilitation disciplines, medical rehabilitation, functional assessment, orientation to rehabilitation equipment and assistive technology, and approaches and methods for rehabilitation, among other topics. The course is taught by individuals from a variety of disciplines and settings including physicians, physical and occupational therapists, speech-language pathologists, orthotists and prosthetists, rehabilitation engineers, psychologists, vocational counselors, nurses, educators, and members of the disabled community.

Beyond the directed study and course on disability and rehabilitation, academic studies for clinical and service training requires extensive reading on a broad range of assistive technologies and technology-related service in the areas of mobility, seating and positioning, augmentative communication, computer access, computer literacy and training, environment control, manipulation aids, and a host of other assistive technologies. Additionally, interns are expected to utilize and obtain hands-on experience with the complete array of specific systems and equipment available within the UMREP. The directed studies of the intern are guided by Professor Levine in collaboration with the rehabilitation engineers employed within the UMREP both at the University Hospitals and off-site at UMRTS. The clinical and service internship includes exposure to both of these environments.

Rehabilitation Engineering Program
Department of Physical Medicine and Rehabilitation
University of Michigan Medical Center

Director: Simon P. Levine, Ph.D., Associate Professor

RESEARCH AREAS

Computerized and Robotic Assistive Systems
Etiology and Prevention of Pressure Sores
Designs for Specialized Needs

Computerized and Robotic Systems for Handicapped People

Computerized Communication Systems for the Handicapped

A number of our research and development projects are aimed at improving computer access and communication for the handicapped. One focus is the study of the handicapped user machine interface. This research includes mathematical modeling of human performance for computer access and utilization of augmentative communication systems. Software development for IBM PC compatible and Apple II computers is another focus which has included abbreviation expansion systems, single switch scanning interfaces, and the interfacing of peripheral devices such as voice synthesizers and environmental controls. Altkey, a memory resident program for IBM PC compatible computers, is the most recent outcome of these development efforts. This program permits a wide range and combination of (programmable) special inputs which allow handicapped users access to the full range of IBM PC compatible applications software.

Funding: University of Michigan Rehabilitation Engineering Program

Autonomous Mobile Robotics

The Mobile Rehabilitation Robotics project is a joint effort between the Rehabilitation Engineering Program and the Robotics Systems Division in the College of Engineering. The focus of this research is the development of an intelligent, autonomous mobile robot base which can be used to assist handicapped people or for patient care. The ultimate goal of this development effort is a truly independent mobile robot that can not only pass from one point in its environment to another while avoiding obstacles, but also (autonomously) follow a user *companion* or guide an individual to a desired location. The mobile robot base is designed to serve as a platform for carrying a variety of environmental manipulators such as robotic arms, environmental control units, or other assistive systems. The first clinical application planned for the mobile robot base is its integration with the computerized activity guidance described below. Development and implementation of the mobile robot base will enable the task guidance system to become mobile and thereby greatly increase the range and type of user applications.

Funding: University of Michigan Medical School and College of Engineering (past)
Michigan Consortium for Enabling Technology (past)
Veterans Administration Rehabilitation Research and Development Service (present)

Assistive Wheelchair Navigation

An outgrowth of the work on mobile robot navigation is the concept of an assistive navigation system for wheelchair control. This system, called NavChair, is intended to provide automatic obstacle avoidance to greatly reduce or eliminate the possibility of collisions for a wheelchair user and wall following capabilities for improved tracking. The goal of this system is to provide improved mobility and safety for people who have impairments which limit their ability to operate a power wheelchair.

Funding: Veterans Administration Rehabilitation Research and Development Service (present)

RESEARCH AREAS (cont.)

Computerized Activity Guidance for Cognitively Impaired People

This project involves computer techniques for assisting patients having cognitive deficits to perform functional tasks. It is potentially applicable to a wide range of cognitive disabilities arising from brain trauma, brain disease, age related memory loss, etc. A custom programming language, COGORTH, has been developed for this purpose. Basically, messages (on the video display) and cues (visual and auditory) are used to guide a patient through sequential steps of a task. Error corrections is performed based on requested user feedback (keyboard input). Extensive branching capabilities allow interruptions of a task by one of higher priority. The system has been successfully demonstrated to guide patients through tasks which could not otherwise be completed without aid. Current work is now focused on software development (completion of a second COGORTH version), vocational applications, and study of remedial effects.

Funding: Robert Wood Johnson Foundation, University of Michigan Biomedical Research Grant (past)

Designs for Specialized Needs

This category represents the design of customized devices for groups or individuals with specialized needs. Most of these projects are based on needs defined from the service delivery component of the Rehabilitation Engineering Program. Customized or one-of-a-kind systems are only considered when there are no other acceptable solutions based on commercially available technology **and** it has been determined that the custom design is affordable, serviceable, and can be delivered in a reasonable amount of time. Examples of previous projects include: A prosthetic terminal device for piano playing (RESNA Student Design Competition Award); Telephone communication system for the handicapped; Design of a lever arm wheelchair propulsion system (Michigan Quest for Technology Award); Design of a mechanical loading system for floppy disks; Portable and self-activated talking tracheostomy systems; Multi-channel joystick control system.

Funding: University of Michigan Rehabilitation Engineering Program

Etiology and Prevention of Pressure Sores

Static and Dynamic Modeling of the Seating Interface

Pressure sores are a common problem for the disabled, especially for individuals who lack sensation in their buttocks and sit in a wheelchair all day. A new model of pressure sore formation has been developed. It is based on tissue deformation rather than the common "pressure" model. This work has led to the development of a quantitative biomechanical model to study the "Dynamic Characteristics of Buttocks Soft Tissue While Sitting". The goal of this research is to predict the dynamic response of tissue to external loads for improved understanding of pressure sore etiology and development of new prevention methods.

Funding: National Institute on Disability and Rehabilitation Research (past)

Electrical Muscle Stimulation for Pressure Sore Prevention

The development of the biomechanical models described above has led to a hypothesis that electrical muscle stimulation (EMS) can help prevent pressure sore formation. The rationale is that 1) tissue undulation produced from EMS (a "short term" effect) will dynamically allow blood flow to ischemic areas; and 2) the changes in vascular and muscle tissue produced from "chronic" EMS will lead to a reduction of pressure sores. Current work is focusing on the short term effects where preliminary results have been supportive of the hypothesis.

Funding: Veterans Administration Rehabilitation Research and Development Service (past)

Name of service: ***Living and Learning Resource Centre (LLRC)***

Name of agency (sponsoring, employing): ***Physically Impaired Association of Michigan***

Address: ***601 West Maple Street, Lansing, Michigan 48906***

Telephone number: ***(517) 487-0883 or 1-800-833-1996***

Contact Person : ***Donna Heiner, Ed.S.*** **Position:** ***Director***

1990 - Activities of note

LLRC Director Donna Heiner participated in the development of a Center for Special Education Technology publication: Comprehensive Assistive Technology Curriculum Outline: A Student-Centered Approach.

The LLRC has been mentioned in a number of national publications, including: InCider Magazine, Closing the Gap, MacWorld, Exceptional Parent Magazine, and the syndicated column "Living With a Disability."

The LLRC was one of four state technology resource centers featured in the "Assistive Technology Resource Directory," published by the Center for Special Education Technology.

We continue to be an active member of the Alliance for Technology Access, now 49 centers strong. Two staff members attended training in Knoxville, Tennessee last summer.

LLRC staff developed six pieces of informational material for distribution at conferences in State and National newsletters, and in response to inquiries for information:

"Conference Report: 1990 Video Teleconference on Communication Aids and Devices for the Disabled"

"Application of Graphics for Communication Boards and for Overlays Designed for Communication Devices"

"Closing the Gap"

"Communication Devices Under $600."

"LLRC Conference Report: RESNA '90"

In-State presentations and workshops for parents and professionals totaled 37. Six presentations at national conferences brought the LLRC and the State of Michigan to the attention of professionals throughout the United States.

1991 - Projected or Underway

The LLRC Software Lending Library for parents of children with physical disabilities will open February 1, 1991. The Library is funded by grants from the Knight Foundation and the Junior League of Lansing.

Donna Heiner, LLRC Director, has authored a publication Technology User in the Classroom: 1. Alternative Keyboards, soon to be published by the Center for Special Education Technology.

References -

The Workplace Workbook: An Illustrated Guide to Job Accommodation and Assistive Technology, by James Mueller, 109 pages, $32. Order from: RESNA Press, Dept. 4813, Washington, DC 20061-4813, (202)857-1199.

Assistive Technology Sourcebook, edited by Alexandra Enders, OTR, and Marian Hall, 600 pages, $60. Order from: RESNA Press, Dept. 4813, Washington, DC 20061-4813, (202)857-1199.

(continued on back)

References - (continued)

Toward Independence. The Accessible Macintosh-Compliance with federal guidelines mandated under Section 508 of the Rehabilitation Act of 1973. Order from Apple Computer, Inc., 20525 Mariani Ave., Cupertino, CA 95014. (408)996-1010

Independence Day: Designing Computer Solutions For Individuals With Disability, by Peter Green, and Alan J. Brightman, Ph.D. Order from: DLM, One DLM Park, Allen, TX 75002, (800)527-4747.

Name of service: ***PAM Assistance Centre***

Name of agency (sponsoring, employing): ***Physically Impaired Association of Michigan (P.I.A.M.)***

Address: ***601 West Maple Street, Lansing, Michigan 48906***

Telephone number: ***(517) 371-5897 or 1-800-274-7426*** **FAX:** ***517-371-5898***

Contact Person: ***Arselia S.Ensign, Ph.D.*** **Position:** ***Executive Director of PIAM/PAM/LLRC***

1990 Activities of note

I. Publications (currently available at $2 prepaid)

#58 - **Home Accessibility 1,** First of a series, February 1990 (8 pp.)
#60 - **Camp-O-Rama,** A Directory of Special Camps, March, 1990 (24 pp)
#61 - **Gardening for All,** May, 1990 (12 pp.)
#62 - **Cookbooks and Good Eating,** June, 1990 (12 pp.)
#63 - **The Selection of a Van Lift or a Scooter,** Sept. 1990 (8 pp.)
#64 - **Public Domain and Shareware Software,** Nov. 1990 (12 pp.)
#65 - **Information for Persons with Hearing Impairment,** Nov.1990 (12 pp.)
#66 - **Home Accessibility 2, Approaches and Entrances** Jan. 1991 (10 pp.)

II. Programs

Planning begun with contracted staff person for more extensive outreach to fragile elderly persons and aging handicappers.

1991 Projected or Underway

Initiation of a new Parent Resource unit.

Ongoing cooperative planning and activities with other organizations (e.g., United Cerebral Palsy, Michigan Center for a Barrier-Free Environment)

Continuation of planning activities with Michigan's "Focus Group" and the Michigan Commission on Handicapper Concerns.

IN ACTION

The Michigan Consortium on Assistive Delivery Systems

Gayle Mefford

Dr. Richard L. Baldwin

Foreground:
Vicki Caruso
Dr. John Eulenberg
Dr. Michael Morrison

Senator Debbie Stabenow

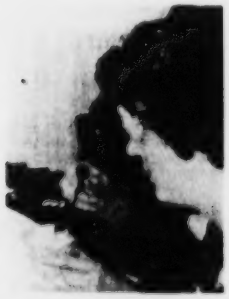
Dr.Lucian Parshall

Penny Zago

Dr. Ralph Pritchard

Mike Gambotto
Dr. Arselia Ensign

Gail Farrell



Donna Heiner

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Jerry Bouman
Bob Lenawee

Dr. Simon Levine
Arthur Turner
Dr. Michael Morrison
Dr. James Kaye

Kathy Fisher and friends

Harold Payne

Dr. Gene Kyle

Lyle Stephens

Dr. Hunt Riegel

Lynn Sweeney

The Video Crew

Dr. Sophia Hadjian

19
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Marcia Moers
Midge Merritt
Kathy Peterson

Videotapes Available on Loan

Jim Scott has provided us with copies of the proceedings of Phase IV, The Michigan Consortium on Assistive Device Delivery Systems. The three videotapes are:

Tape I, February 10, 1991

Accommodations and Device Accessibility-The Michigan Scene
Mike Gambotto, Michigan Commission on Handicapper Concerns
Richard A. Baldwin, Ed.S., Special Education Services, MI Department of Education
The Americans with Disabilities Act
Michael Morris, United Cerebral Palsy Association, Washington, D.C.

Tape II, February 11, 1991

State Government and Disability Issues
Senator Debbie Stabenow
Educational Trends in Michigan and the U.S.
Gene Kyle, Ph.D.
Trends Translating into Action
Michael Morris, United Cerebral Palsy Association, Washington, D.C.
Making More Happen in Michigan
Lynn A. Sweeney, ACT Center, Central MI University

Tape III

CASE STUDIES IN ASSISTIVE DEVICE DELIVERY and ACCOMMODATIONS IN INCLUSIVE SETTINGS.
Ralph Pritchard, Ph.D., Macomb I.S.D.
Lyle L. Stephens, Special Transportation, Inc., Lansing, MI
Bob Beard, MI Rehabilitation Services, Lansing, MI
PERSPECTIVES
R. Hunt Riegel, Ph.D., Project ACCESS, Wayne County Intermediate School District

Videotape Loan Request

* Please send Tape #____, #____, #____.

* I am enclosing $5.00 mailing and handling fee for an individual tape or $10.00 for all 3 tapes. Amount enclosed, $_____.

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Name_____

Address_____

_____ Phone_____

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3 . . . Adaptive Devices Applied Methods Lab (ADAM Lab) - Wayne Co. I.S.D.
4 . . . 4-Sights Network - Greater Detroit Society for the Blind
5 . . . Adaptive Communication Technology Center of Central MI Univ. (ACT Center)
6 . . . Charles VanRiper Language, Speech and Hearing Clinic - Western MI University
7 . . . Equipment and Technology - Detroit Institute for Children
8 . . . Michigan Consortium for Enabling Technology (MCET)
9 . . . Macomb Augmentative Communication Project
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